OBSERVATIONS ON PRASIOLA MEXICANA, A FRESHWATER ALGA OF UNKNOWN RELATIONSHIPS

Herbert F. Copeland

The observations upon *Prasiola mexicana* J. Agardh which are here presented were made in the expectation that they would clarify the relationships of this organism. This expectation has not been fulfilled.

Prasiola mexicana produces thin green thalli, of small to moderate size, on stones in mountain streams. In conventional classification it is placed in or near the family Ulvaceae, to which plants, however, it is not closely similar in microscopic structure. The cells of *Prasiola* (their dimensions are of the order of 5 to 10μ) become separated in a colorless matrix. They divide in three planes. A cross section of the thallus shows ordinarily two layers of octettes of cells. Continuing division may produce columns of several cells. These features of the structure are shown in the illustrations of Setchell and Gardner (1920). In living material the protoplast appears to consist principally of a single bright green plastid lying in the middle of the cell and connected to the cell membrane by radiating strands (fig. 1, a). Setchell and Gardner suggested the possibility that *Prasiola* may not belong naturally with the green algae, but with the primitive red algae. According to Kylin (1930), however, the pigmentation is that of green algae and higher plants.

The material studied was collected in Butte Creek at Jonesville, Butte County, California, at an altitude of about 1500 m. Since nuclear and cell division occur in many organisms at particular times of the day, material was fixed at intervals of from one to two hours during one day and night. Portions of each collection were fixed respectively in iron acetocarmine and in FAA. A part of the material in FAA was stained as whole mounts with Heidenhain's haematoxylin; another part was dehydrated, imbedded, and sectioned at 10μ. Some of the sections were stained with Heidenhain's haematoxylin, and others with other stains, including basic fuchsin applied after several minutes exposure to warm normal hydrochloric acid.

No difference was observed in the condition of the cells fixed at different times; in particular, an abundance of newly divided cells was present in every collection. The sectioned material stained with Heidenhain's haematoxylin showed the internal structure most clearly: other techniques gave the same results as this, or else failed to show the internal structure.

As protoplasts stained in Heidenhain's haematoxylin are destained in iron alum, four concentric parts become distinguishable. In order from outside to inside, these are as follows (fig. 1, b, c, d).

1. A narrow superficial layer is destained promptly.

2. Within the foregoing there is a thicker layer which is more resistant to destaining. After very brief destaining it appears as a solid black mass

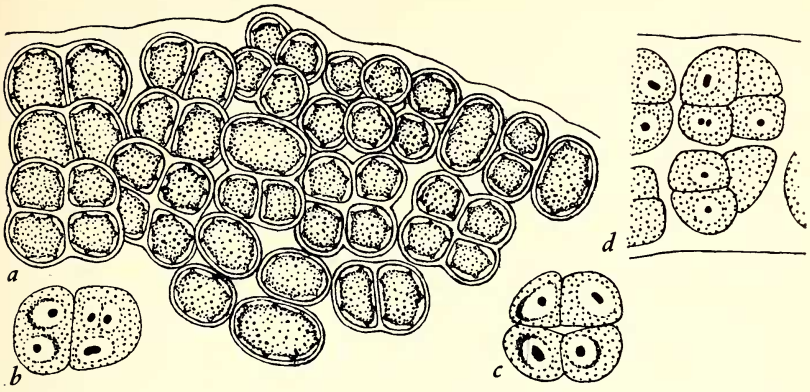

FIG. 1. *Prasiola mexicana. a,* living cells in surface view; *b, c, d,* stained cells, *b, c,* in surface view, *d,* in a cross section of the thallus; all × 1000.

nearly filling the cell. Further destaining decolorizes it gradually from without inward; eventually, it becomes indistinguishable from the superficial layer. This body is believed to be the plastid.

3. Inside of the plastid there is a fairly extensive area (here called the "clear space") which is more promptly destained. No definite membrane has been seen at the boundary of the clear space.

4. In the middle of the clear space there is a granule (here called the "central granule") about 0.5μ in diameter. It is the most resistant to destaining of all parts of the cell. It is sometimes slightly irregular in outline. In some preparations one can see vague strands radiating from it. No internal structure has been seen.

At least one clear space and one central granule are present in every cell. In many cells, the central granule is elongate. Rarely, two central granules can be found in one clear space; usually, if a cell contains two or more central granules, even quite close together, they lie in separate clear spaces. It appears that the central granule divides by constriction and that the clear space divides very promptly after it. Constriction of the protoplast is less prompt, and may be delayed until four or more clear spaces and central granules are present.

According to these observations, cells of *Prasiola mexicana* have no nucleus in the proper sense of the word: no structure limited by a membrane, and whose division involves the appearance and division of definite chromosomes, was seen. Nothing was seen of the nature of the parietal granule, apparently a primitive nucleus, which has been described in the lower red algae, in *Porphyridium* by Lewis and Zirkle (1920), in *Porphyra* by Ishikawa (1921), and in *Bangia* by Dangeard (1927). The structure is not that of the blue-green algae. Except for the plastid, it is very much like bacterial structure as it is currently understood (Robinow, 1942, 1949; Tulasne and Vendrely, 1947; Hillier, Mudd,

and Smith, 1949). The relationships of *Prasiola* remain altogether obscure.

Sacramento Junior College,
Sacramento, California.

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A NEW SPECIES OF BOUVARDIA (RUBIACEAE) FROM BAJA CALIFORNIA, MEXICO

Annetta Carter

During the past sixty or seventy years the flora of Baja California, Mexico, has become reasonably well known in the vicinity of anchorages along the Pacific Ocean and Gulf of California, in the mountains of the north and some of those of the Cape Region, and along "El Camino Nacional," as the main route of travel the length of the peninsula is now officially known. Whenever a botanist manages to get off the beaten track, however, he is quite apt to find plants of special interest. Arroyo del Salto, which empties into the Gulf east of La Paz near Las Cruces in the Cape Region, is such a place. Here, where a granite dike forms a dam across the upper reaches of the deep and narrow canyon, is an oasis of tall palms (*Erythea Brandegeei* Purpus) and an abundance of such moisture-loving herbaceous plants as *Samolus ebracteatus* H.B.K., *Bacopa Monnieri* (L.) Pennell, and *Cyperus*. On the drier talus slopes and cliffs, in addition to the usual *Lysiloma candida* Brandegee, *Jatropha cinerea* (Orteg.) Muell., *Cyrtocarpa edulis* (Brandegee) Standl., and *Fouquieria peninsularis* Nash, I found the *Bouvardia* described below as well as the